

## **4.4 COMMUNITY INFRASTRUCTURE AND MUNICIPAL SERVICES**

### **4.4.1 Roadways**

#### **4.4.1.1 Introduction**

This section provides an evaluation of the existing conditions of the surface transportation system in the study area. Future roadway conditions with the Proposed Project and an identification of the needed roadway improvements in the study area will be presented in [Section 5](#) of this EIS. The following alternatives will be analyzed:

- The preferred alternative, i.e., the terminal located in Daniel Island with a main access through a proposed access road connected to the existing interchange at Clements Ferry Road.
- A variation of the preferred alternative, with access to the terminal provided by a roadway connecting the new Daniel Island interchange (this new interchange is located east of the existing Clements Ferry Road interchange and is currently under construction).
- An alternative that evenly splits the proposed cargo demand between the former Naval Base and the Daniel Island site. Only buildout (Year 2020) conditions are evaluated for this alternative.

Each of the above alternatives will be analyzed under two rail utilization scenarios. For the first scenario, approximately 25 percent of the cargo is assumed to be transported to and from the terminal via railroads, with the remaining 75 percent of the cargo transported by trucks. The second scenario assumes that 40 percent of the cargo is transported via rail lines and 60 percent is transported by trucks. It should be noted that approximately 25 percent of the cargo is being transported by rail in the existing SCSPA terminals.

#### **4.4.1.2 Transportation Impact Study Area (TISA)**

The transportation impact study area (TISA) is composed of the roadways that would be impacted by vehicular traffic generated by the project. The TISA for this study was defined as those regionally significant roadway segments and intersections where the projected peak hour traffic generated by the project would equal or exceed 5 percent of the capacity of the facility. [Figures 4.4.1-1 and 4.4.1-2](#) illustrate the TISA for the two sites under study.

#### **4.4.1.3 Existing Roadway Characteristics**

The following paragraphs summarize the existing characteristics for the main roadways in the study area.

##### **Mark Clark Expressway (I-526)**

This is a key facility in the area, providing fast and reliable connection between North Charleston, Daniel Island and Mount Pleasant. The facility opened to traffic in 1992, as a four-lane limited access freeway. Most of the heavy truck traffic between Mount Pleasant and Charleston uses this facility instead of the

Pearman bridge on U.S. 17. I-526 carried 34,700 vehicles per day in 1997 in the section just east of Clements Ferry Road. Major interchanges in this facility include the existing unsignalized interchange in Daniel Island and S.R. 33, the second Daniel Island interchange (under construction), and interchanges in Virginia Drive, North Rhett Avenue, Rivers Avenue, I-26 and Long Point Road. According to the 1998-2002 Charleston Area Transportation Study (CHATS), the proposed plan for this facility is to extend it from its current terminus on U.S. 17 South (Savannah Highway) to S.C. 171 (Folly Road); however, this improvement project has not been funded or programmed.

#### **St. Thomas Island Road/Daniel Island Drive**

At the present time, St. Thomas Island Road is a two-lane undivided roadway that becomes Daniel Island Drive east of the Beresford Creek crossing. This facility provides access to the existing and planned residential areas of the island. The facility in 1997 carried approximately 3,500 vehicles per day.

#### **Clements Ferry Road**

This is the main north-south facility in the Cainhoy Peninsula. Clements Ferry Road is a two-lane undivided facility, with limited four-lane sections near several major developments that are either already in place or under construction. The 1997 average daily traffic on Clements Ferry Road is approximately 4,000 vehicles per day south of I-526 and approximately 7,400 vehicles per day in the segment north of I-526.

#### **Cainhoy Road**

Currently, Cainhoy Road is a north-south two-lane road that provides access to Clements Ferry Road from areas near the Francis Marion National Forest and communities such as Huger. In 1997 Cainhoy Road carried approximately 7,300 vehicles per day.

#### **U.S. Forest Service Roads**

Three Forest Service roads (Forest Route (FR) 188 - Brick Church Road, FR 189, and FR 189A) are found within the study area. All three roads are maintained two-lane dirt/gravel roads. Brick Church Road provides an east-west connection between Cainhoy Road and SR 41.

#### **Interstate 26 (I-26)**

This facility is one of the principal routes in the state, providing a connection between Charleston and Columbia. Within the Charleston metropolitan area, I-26 provides access to northern Berkeley County and the cities of Hanahan, North Charleston, and Charleston. I-26 has six lanes throughout the study area. According to the CHATS, several improvement projects are programmed for this facility, including upgrades of the interchanges at U.S. 78, Remount Road, U.S. 17A, and Ashley Phosphate Road. The 1997 traffic volumes on the interstate segments within the study area ranged from 53,400 vehicles per day in the segment just north of University Boulevard, to a maximum flow of 104,500 vehicles per day in the Montague Avenue to I-526 segment.

### **Montague Avenue**

An east-west roadway, Montague Avenue is a principal arterial within North Charleston, and the land uses along its corridor include several service-related facilities, such as gas stations and banks, a considerable number of hotels/motels and several industrial/light industrial sites, and some limited single-family residential units. Several intermodal yards have access via Montague Avenue, in areas adjacent to the Norfolk Southern Railroad (east of I-26) and also near the CSX Transportation Railroad corridor between I-526 and I-26 and west of I-526 near Dorchester Road. In the section between I-526 and I-26, the traffic on Montague Avenue was approximately 14,000 vehicles per day in 1997. No roadway improvements are planned for this facility.

### **North Rhett Avenue**

North Rhett Avenue is a north-south arterial in North Charleston and Hanahan, running parallel to the CSX rail line, with several intermodal yards and other industrial sites between Remount Road and Yeamans Hall Road. In the area near Yeamans Hall Road and between I-526 and Montague Avenue, this facility serves residential neighborhoods. North Rhett Avenue is currently programmed to be widened to a 5-lane cross section (two lanes in each direction plus a center lane for left turns) from Remount Road to Red Bank Road. The section between Yeamans Hall Road and Foster Creek Road is currently under construction, while the remainder of the project is in the design phase. Recent traffic counts indicate that approximately 26,100 vehicles per day traveled on North Rhett Avenue in the section just north of I-526.

### **Spruill Avenue**

This roadway is in the study area of the Former Naval Base alternative. Within the study area, Spruill Avenue is a four-lane arterial that traverses predominantly industrial land uses and several intermodal yards, with an average daily traffic of 9,400 vehicles in the section just north of the Former Naval Base. No improvements are planned for this facility.

#### **4.4.1.4 Traffic Count Program**

Traffic count data was obtained from the South Carolina Department of Transportation (SCDOT). The SCDOT traffic counts were supplemented by a count program performed by URS Greiner and Wilbur Smith Associates. The traffic count data are provided in a separate report on file at the SCSA offices. The following locations were counted:

24-hour vehicle classification counts (in 15-minute intervals):

- I-526 (2 locations, east and west of the Daniel Island Interchange)
- I-526 and Virginia Avenue ramps
- I-526 and North Rhett Avenue (Ramps to and from Daniel Island)
- I-526 and Rivers Avenue (Ramps to and from Daniel Island)
- I-526 and US 17 (Ramps to and from Daniel Island)
- Clements Ferry Road, north of I-526 (2 locations)
- Virginia Avenue, south of Remount Road
- North Charleston Terminal Entrance and Exit

Virginia Avenue, south of I-526  
Columbus Street Terminal Entrance Road  
North Charleston Terminal Entrance (Remount Road)  
Daniel Island Drive, south of I-526  
Long Point Road, just outside the Wando Welch Terminal  
Immigration Street (Columbus Street Terminal)  
Reynolds Avenue, just east of Spruill Avenue

Peak Hour Turning Movement Counts (7-9 a.m. and 4-6 p.m.):

East Bay Street and Immigration Street (Columbus Street Terminal Entrance)  
Reynolds Avenue and Spruill Avenue (current entrance to Former Charleston Naval Base)  
Cosgrove Avenue and Spruill Avenue  
Virginia Avenue and Remount Road  
I-526 and Clements Ferry Road  
I-526 and Long Point Road  
I-526 and Virginia Avenue

#### **4.4.1.5 Existing Conditions Analysis**

Tables 4.4.1-1 and 4.4.1-2 summarize the existing volumes, capacity, and level of service for the key roadways and intersections in the TISA. A link identification map is shown on Figure 4.4.1-3. The capacity evaluation for the intersections and ramps in the study area was performed using the Highway Capacity Software (HCS). The freeway, arterial, and highway level of service was determined using the FREE-TAB, ART-TAB, and R2LN-TAB software, developed by the Florida Department of Transportation and consistent with the methodology contained in the 1994 Highway Capacity Manual. The concept of level of service, as explained in the Highway Capacity Manual, can be described as follows:

*LOS A* describes primarily free flow operations at average travel speeds. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Stopped delay at signalized intersections is minimal.

*LOS B* represents reasonably unimpeded operations at average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted and stopped delays are not bothersome. Drivers are not generally subjected to appreciable tension.

*LOS C* represents stable operations; however, ability to maneuver and change lanes in midblock locations may be more restricted than at LOS B. Motorists will experience appreciable tension while driving.

*LOS D* borders on a range in which small increases in flow may cause substantial increases in delay and hence decreases in arterial speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or some combination of these factors.

*LOSE* is characterized by significant delays. Such operations are caused by some combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.

LOS F characterizes arterial flow at extremely low speeds below one-third of the free-flow speed. Intersection congestion is likely at critical signalized locations, with high delays and extensive queuing.

As shown in [Table 4.4.1-1](#), several roadway segments along I-526 are operating at or near capacity, with level of service “D” throughout most of the North Charleston area and level of service “E” near I-26. The other facility operating with significant delays and congestion is I-26, with the section from Montague Avenue to Aviation Avenue operating at level of service “E” during the peak hour periods. All other facilities and intersections (see [Table 4.4.1-2](#)) analyzed within the study area performed with satisfactory levels of service, i.e., “C” or better. Capacity analyses data are contained in [Appendix 4.4.1-1](#).

#### **4.4.1.6 Trip Generation of Existing Terminals**

The traffic count program included counts on three existing SCSPA terminals, i.e., the Wando Welch, North Charleston, and Columbus Street terminals. [Tables 4.4.1-3 and 4.4.1-4](#) summarize the trip generation characteristics of the existing terminals. As shown in [Table 4.4.1-4](#), the three existing terminals generated 12,741 vehicle trips a day, with Wando Welch accounting for 54 percent of the total daily traffic and North Charleston and Columbus Street terminals generating 23 percent each. The peak hour of travel took place in the morning, between 7 a.m. and 8 a.m. During this period, 1,000 vehicles entered and 169 vehicles exited the terminals. Approximately 77 percent of the total traffic was made up of trucks with three or more axles.

#### **4.4.1.7 Trip Distribution of Existing Terminals**

The identification of the existing truck routes (primary arrival and departure routes utilized by trucks traveling to/from existing terminals) was needed in order to identify the potential truck routes for the Proposed Project and to properly assess the impacts of the proposed alternatives on the roadway network. The existing truck routes were identified by performing an Origin and Destination (O/D) study which included interviews with the truck drivers entering and leaving the North Charleston, Wando Welch and Columbus Street terminals. The detailed results of the O/D study are contained in the April 1998 Technical Memorandum “Origin and Destination Survey for Truck Traffic Associated with the Columbus Street, North Charleston, and Wando Welch Terminals” included in [Appendix 4.4.1-2](#).

#### **4.4.1.8 Transportation Modeling - CHATS TRANPLAN Model**

The Charleston Transportation Study (CHATS) TRANPLAN computer model was used as a tool to estimate the future traffic volumes of the roadways in the study area. A copy of the recently validated CHATS TRANPLAN model was obtained from the Berkeley Charleston Dorchester Council of Governments (BCDCOG). Several modifications were made to the model roadway network in order to reflect the existing and committed roadways in the study area per the 1998-2002 CHATS Transportation Improvement Program. Some adjustments were made to the model’s socioeconomic data on the traffic analysis where

the existing terminals are located. These adjustments were made in order to calibrate the trips generated from those sites to the actual traffic volumes counted. Likewise, the origin and destination data obtained in the O/D survey was used to modify the model's trip distribution output. A list of the revisions made to the model is included in [Appendix 4.4.1-3](#).

#### **4.4.1.9 Accident History/Safety**

In order to assess the past accident history of the roadways in the study area, accident records were obtained from the offices of the South Carolina Department of Safety. The accident data are summarized for key roadways in the vicinity of the existing terminals for the past six years (1992 to 1997) and include information such as number of accidents, number of accidents involving trucks, accidents related to railroad crossings, and the number of fatalities and injuries. [Tables 4.4.1-5 and 4.4.1-6](#) summarize the accident information collected. As shown in [Table 4.4.1-5](#), the section of Remount Road between the North Charleston Terminal and Rivers Avenue is the facility with the highest number of accidents, with a total of 878 accidents during the 1992-1997 period. Regarding accidents involving trucks, all of these facilities have a large proportion of truck traffic, yet only a combined 9.6 percent of the accidents involved trucks.

A total of 17 accidents at or near railroad crossings took place during the 1992-1997 period, representing approximately 1.4 percent of the total accidents on roadways with rail crossings. Most of the accidents at or near railroad crossings generally occur as a result of driver negligence and failure to stop at the rail crossings. Accident data summaries are contained in [Appendix 4.4.1-4](#).

#### **4.4.2 Railroads**

[Figure 4.4.2-1](#) depicts the existing rail network in the study area. As shown, at the present time, no rail lines or rail connections exist on Daniel Island. Of the three major SCSPA marine terminals, North Charleston and Columbus Street have on-site rail connections. The rail corridor serving the North Charleston Terminal has several at-grade roadway crossings, such as the ones near Virginia Avenue between Remount Road and I-526, Remount Road just west of Perimeter Road and Montague Avenue just east of Spruill Avenue. CSX Railroad provides access to the Columbus Street Terminal. The rail corridor in the vicinity of this terminal runs east of East Bay Street and Morrison Drive, with an at-grade roadway crossing on Immigration Street.

Wando Welch Terminal does not have direct rail service but a significant portion (over 15 percent) of its throughput is drayed (carried by truck) to existing intermodal facilities such as CSX Intermodal, Norfolk Southern Railroad and other North Charleston sites adjacent to North Meeting Street, Montague Avenue, Dorchester Road, and North Rhett Avenue.

The CSX rail line runs parallel to Spruill Avenue in the vicinity of the Former Charleston Naval Base and Norfolk Southern has a rail line that ends near the northern boundaries of the former base, just southeast of the intersection of Virginia and Montague Avenues.

As stated in [Section 4.4.1](#), an evaluation of existing accident records for roadways in the study area indicated that a total of 17 accidents at or near railroad crossings occurred during the 1992-1997 period,

which represents approximately 1.4 percent of the total accidents that occurred on roadways with rail crossings.

A detailed evaluation of current operations of intermodal operations for CSX and Norfolk Southern was conducted in 1994 by Vickerman, Zachary and Miller as part of the Final Technical Report for the Charleston Navy Base Reuse Plan. Relevant excerpts from this document are provided in [Appendix 4.4.2-1](#).

### **Traffic Operations at Railroad Crossings**

Some of the roadways in the study area are crossed at grade by rail lines. When a train crosses one of these roads, it will produce delays and vehicular queues as the vehicles are forced to stop and wait until the train passes by and then it takes additional time for the vehicular queue to clear up.

[Table 4.4.2-1](#) provides a summary of potential queues and delays that can take place in existing railroad crossings for major roadways in the study area. It should be noted that this evaluation assumes that the train crossing takes place during the peak hour of vehicular traffic. As shown in [Table 4.4.2-1](#), crossing of a 4,000-foot train could cause average delays of up to 2 minutes per stopped vehicle and vehicular queues of more than 20 vehicles.

### **4.4.3 Water Supply and Wastewater Treatment**

#### **4.4.3.1 Water Supply**

The following public water supply systems in the Tri-County area currently provide 88.2 million gallons per day (mgd) to approximately 350,000 of the nearly 500,000 individuals within the study area:

- Charleston Commissioners of Public Works
- Berkeley County Water and Sanitation Authority
- Dorchester County Water Authority
- Mount Pleasant Water and Sewer Commission
- Moncks Corner Commission of Public Works
- Summerville Commission of Public Works
- Dorchester County Water and Sewer Department
- Goose Creek Commission of Public Works
- Town of Jamestown
- Town of Ridgeville
- Town of Harleyville
- Town of St. George
- Town of Kiawah Island
- Town of Seabrook Island
- Town of St. Stephens
- Town of Hollywood
- Town of Edisto Beach
- Town of Meggett
- City of Folly Beach
- James Island Public Service District
- Isle of Palms Water and Sewer Department
- Sullivans Island Water and Sewer Department
- St. Johns Water Company

## **Water Resource Characteristics**

There are two main water suppliers within the study area: the Lake Moultrie Water Authority (LMWA) and the Charleston Commission of Public Works (CCPW). The LMWA water supply is drawn from Lake Moultrie and then wholesaled to the following:

- Summerville Commission of Public Works
- Goose Creek Commission of Public Works
- Moncks Corner Commission of Public Works
- Berkeley County Water Sewer Authority

LMWA owns and operates a 12 mgd water treatment plant with a treatment capacity of 24 mgd, and an approved capacity of 36 mgd. There are two 48-inch intake lines running from Lake Moultrie to the treatment plant; however, one of these lines is currently capped. LMWA is planning to increase capacity at their treatment facility to 36 mgd as demand increases. The existing distribution system consists of a single 26-mile long, 48-inch line. There are seven master meters located along the main distribution line and one meter that is allocated to Summerville, Goose Creek and the Moncks Corner Commission of Public Works, and four meters allocated to the Berkeley County Water and Sewer Authority.

Water resources for the CCPW are supplied by the Edisto River, Bushy Park Reservoir, and the Goose Creek Reservoir. CCPW wholesales water to the Towns of Mount Pleasant, Sullivans Island, Isle of Palms, and Johns Island. CCPW owns and operates the 118-mgd Hanahan Water Treatment Facility.

## **Water Providers within the Study Area**

### **Charleston Commissioners of Public Works**

The CCPW owns and operates water distribution systems within the City of Charleston and wholesales water to the surrounding communities of Isle of Palms, Town of Mount Pleasant, and Sullivans Island. A recent service area agreement with the Berkeley County Water and Sanitation Authority will allow the CCPW to provide water to those areas located on Daniel Island recently annexed by the City of Charleston, and various unincorporated areas of Berkeley County. In order to serve these areas, the CCPW has installed a 30-inch water main along Highway 33 and Clements Ferry Road which terminates at Highway 98.

### **Mount Pleasant Water and Sewer Commission**

Mount Pleasant receives approximately 1 million gallons of water per day from the CCPW with the remainder being supplied by Mount Pleasant's 3 Reverse Osmosis Plants. The Mount Pleasant Water and Sewer Commission serves a population of approximately 40,000 individuals with an average daily demand of 7.3 mgd.

### **Berkeley County Water and Sanitation Authority**

The Berkeley County Water and Sanitation Authority (BCWSA) serves most of the rural and industrial areas in Berkeley County with assistance from the CCPW. The BCWSA serves a population of approximately



19,000 individuals with an average daily demand of 3.5 mgd. BCWSA also provides service to the Nucor and Amoco industrial complexes with an average daily demand of 1.0 mgd.

#### **4.4.3.2 Wastewater Treatment Facilities**

There are 18 existing municipal wastewater treatment facilities within the study area. Berkeley County has 7 treatment facilities with the largest number of plants operated by the Berkeley County Water and Sanitation Authority. Charleston County operates 8 municipal wastewater treatment facilities, with the CCPW operating 4 plants. In addition, Dorchester County has 3 treatment facilities with 1 plant each in St. George, Summerville, and Harleyville. The maximum present design capacity for Berkeley County is 15 mgd for the BCWSA. [Table 4.4.3-1](#) summarizes information related to wastewater treatment facility capacities and discharge points. [Section 4.17](#) of this EIS provides details related to legislation and regulations involving water and water resources.

#### **4.4.4 Stormwater Management Facilities**

Existing drainage patterns, water quality treatment peak flow attenuation facilities, and governmental agencies with jurisdictional authority with respect to stormwater discharge were examined for Daniel Island, the area north of Daniel Island up to the Francis Marion National Forest (approximately 41,500 acres), Charleston Naval Base, and the Columbus Terminal. Major drainage basins were delineated, and an inventory of major outfalls and permitted stormwater treatment peak flow attenuation facilities were compiled.

##### **4.4.4.1 Jurisdictional Authority**

Stormwater management facilities such as retention ponds, detention ponds, open and closed storm sewer systems, wetland mitigation areas, drainage canals, oil-water separators, etc. may require permits or approvals from city, county, state and federal regulatory agencies prior to construction. These agencies ensure that stormwater management facilities are designed to control flooding and protect water quality from the impacts of development.

Federal (United States Environmental Protection Agency [USEPA]), State (South Carolina Department of Health and Environmental Control [SCDHEC]), County (Berkeley and Charleston), and City (Charleston and North Charleston) agencies regulate stormwater discharges at Daniel Island, Charleston Naval Base, and the Columbus Street Terminal as shown in [Table 4.4.4-1](#).

##### **4.4.4.2 Daniel Island Peninsula and Cainhoy Area**

The existing drainage patterns and water treatment facilities were evaluated for the Daniel Island peninsula and the area north encompassing approximately 41,500 acres, (referred to as the Cainhoy area for the remainder of this discussion). The Daniel Island peninsula is located in the City of Charleston in the Southern part of Berkeley County, bounded on the west by the Cooper River, the east by the Wando River, the south by the confluence of the Cooper and Wando rivers, and the north by Beresford Creek. The Cainhoy area is north of the Daniel Island peninsula and fans out between the Cooper and Wando rivers

to the Francis Marion National Forest. The Cainhoy area includes incorporated areas in the City of Charleston and unincorporated areas in Berkeley County.

### **Drainage Patterns**

Existing drainage patterns are discussed separately for the Daniel Island peninsula and the Cainhoy area to the north. The Daniel Island peninsula and Cainhoy area are shown on [Figures 4.4.4-1 and 4.4.4-2](#), respectively. The drainage evaluation consisted of delineating sub-basins and locating major outfalls to the Cooper and Wando rivers. Both the existing and future build out drainage systems for the Daniel Island residential and commercial development were examined.

### **Daniel Island Peninsula**

The evaluation of the Daniel Island peninsula included approximately 3,314 acres, from the confluence of the Wando and Cooper rivers to the Mark Clark Expressway and Beresford Creek (see [Figure 4.4.4-1](#)). The area is separated into a South Drainage Basin and North Drainage Basin based on information derived from a Quadrangle Map for Charleston, South Carolina (USGS, revised in 1983), aerial photographs (Photogrammetric Data Services, Inc., 1998), site plan of Daniel Island by the (SCSPA, January 1988), and a Phase I Storm Drainage Master Plan of the residential and commercial area of Daniel Island, (Thomas and Hutton Engineering Company, August 1997).

The South Basin is approximately 1,289 acres, enclosed by a dike around the periphery of the southern tip of Daniel Island and an “L” shaped dike extending from the east bank of the Cooper River to the west bank of the Wando River. Interior manmade dikes divide the South Basin into five cells or sub-basins. The dikes were constructed by the SCSPA to contain spoil material dredged from the Cooper River, Wando River and Charleston Harbor. The Wando Cell, Middle Cell and West Cell at the southern end of Daniel Island are used to deposit non-hazardous spoil material. The Middle Cell was split into two sections with a dike extending from the dikes bordering the Wando and West Cell. The Central Cell is used to deposit hazardous spoil material. The average top elevation of the dikes enclosing the Wando Cell, Middle Cell West Cell and Central Cell is approximately 27 feet NGVD, 1929. The average bottom elevation within the dikes is approximately 25 feet NGVD, 1929. The land within the dikes of the Wando Cell, Middle Cell West Cell and Central Cell is flat, barren and without vegetation. The spoil material within the cells consists of fine silty unstable material saturated with water.

The North Cell is an old spoil area currently cultivated for agricultural crops. The average top elevation of the dike enclosing the cell is approximately 15 feet NGVD, 1929. Average elevations within the dikes of the North Cell are approximately 10 feet NGVD, 1929. The North Basin is comprised pre-dominantly of fallow land in most areas, and forest land along the west dike.

The existing drainage system in the Wando Cell, Middle Cell West Cell, and Central Cell consists of 17 permitted flash board risers discharging into the Cooper River, Wando River and a man-made channel extending from the east bank of the Cooper River to the west bank of the Wando River. An additional flash board riser hydraulically connects the two sections of the Middle Cell. The flash board risers were permitted by the OCRM under their Direct Critical Area Permits (Permit No. OCRM-97-348-7). The flash board risers consist of a shaft approximately 30 feet deep and 4 feet square. The shaft walls were constructed of

pressure treated lumber supported by steel brackets spaced approximately one foot on center. The shaft opening is at existing ground level and terminates at the upstream end of a 30-inch diameter corrugated metal discharge pipe. Additional brackets are in place above the existing ground level in order to install pressure treated lumber when ground elevations increase with the addition of fill and to control water elevation. A boardwalk was constructed at each flash board riser in order to access and maintain the structure. The area, land use(s), flash board riser(s), and outfall location(s) for the Wando, Middle, West, Central and North Cells are shown in [Table 4.4.4.-2](#).

Ponding in the Wando, Middle, West and Central Cells is prevalent due to the flat terrain, low permeability and high water capacity of the deposited dredged material from the Cooper and Wando Rivers (U.S. Soil Conservation and Forest Service, January, 1980). Therefore, surface runoff within the cells is routed to the flash board risers in temporary earth lined channels approximately one to three feet deep.

Surface runoff in the North Cell currently drains to the Cooper River through breaks in the old dike at the west end and through a permitted flash board riser draining to the manmade canal at the south end. The SCSA plans to construct three flash board risers in the North Cell when it will be utilized as a spoil area in the future.

The North Basin consists of 4 sub-basins and is approximately 2,025 acres with the Mark Clark Expressway and Beresford Creek at the north boundary and the “L” shaped dike at the south boundary. The terrain is flat with slopes averaging less than 5 percent. Undeveloped farmland and woodland dominate the upland areas, at elevations ranging from approximately 10 to 15 feet NGVD, 1929. Small pockets of isolated wetlands are scattered throughout the upland areas. Saltwater marsh occupies the perimeter of Daniel Island and tributaries of the Cooper River, Wando River and Beresford Creek extending inland. The average elevation of the saltwater marshes is approximately 5 feet NGVD, 1929. Recently developed residential/commercial properties by Daniel Island Company, Inc. and the Bishop England School have added impervious surfaces such as paved parking lots, streets, driveways, sidewalks and rooftops in the north region of the North Basin. Except for runoff from impervious surfaces, runoff is minimized in the upland areas because soils are moderately well drained loamy sands with moderate permeability. However, the soils in the saltwater marshes are predominantly loamy at the surface, clayey at the subsurface, poorly drained, have low permeability and have high runoff potential (U.S. Soil Conservation and Forest Service, January 1980).

Runoff from the upland areas drain to saltwater marshes by unnamed tributaries discharging into the Cooper River, Wando River and Beresford Creek. Six of these tributaries and two outfall pipes, discharging from Treatment Ponds, SF5 and 1A, at the Health Source facility adjacent to the Mark Clark Expressway and the residential area respectively, are the major drainage outfalls for the North Basin. The bold arrow heads on [Figure 4.4.4-1](#) show the location of the eight major drainage outfalls in the North Basin. The six unnamed tributaries are named W-1, W-2, W-3, W-4, C-1 and B-1 for identification purposes. Conveyance in the unnamed tributaries and Beresford Creek is influenced by the semi-diurnal tidal cycle of the Cooper and Wando rivers. The mean tidal range experienced at Daniel Island is approximately 5.0 feet, and the spring tidal range is up to approximately 6.0 feet (see [Section 4.17](#) Hydrology and Water Quality for more tide information).

Sub-Basin N-1 is approximately 900 acres. It is bordered by Beresford Creek at the north, Seven Farms Drive to the south, Mark Clark Expressway to the east and Clouter Creek and the Cooper River to the west. The Bishop England School Site and all of the residential/commercial areas occupy approximately 600 acres in Sub-Basin N-1. The remaining 300 acres in Sub-Basin N-1 are occupied with saltwater marsh along Beresford Creek and the Cooper River, isolated wetlands bounded with freshwater buffers and agricultural land adjacent to the Mark Clark Expressway are intended for future development. Drainage in the Daniel Island residential and commercial communities currently consists of curb and gutter, roadside ditches and underground storm sewers conveying runoff to eight permitted stormwater retention ponds. A total of seventeen permitted ponds are planned for future build out conditions (Thomas and Hutten Engineering Company, August 1997). Currently, Sub-Basin N-1 has four major outfalls. Three outfalls discharge into Beresford Creek at Tributary B-1, outfall pipe from Pond 1A, and the outfall pipe from Pond SF5. The fourth outfall discharges into the Wando River at Tributary W-2. A fifth outfall is intended to discharge runoff, collected in Pond SF3, into the Wando River at Tributary W-1 under future build out conditions. The drainage information for Sub-Basin N-1 shown on [Figure 4.4.4-1](#) includes existing and future build out conditions for the Daniel Island Residential/Commercial Development. Existing and future ponds and outfall locations are shown with solid and dotted lines, respectively.

Tributaries identified as W-3 and W-4 discharge into the Wando River and collect runoff from Sub-Basins N-2 and N-3 respectively. The tributary identified as C-1 conveys runoff from Sub-Basin N-4 into the Cooper River. Runoff from Sub-Basins N-2 and N-3 also drains to the manmade channel adjacent to the dike separating the North and South Basins. Farmland, woodland and saltwater marsh are the primary land uses in sub-basins N-2, N-3, and N-4. Small pockets of isolated wetlands bounded with freshwater buffers occupy the central area. Runoff from the upland areas is trapped in isolated wetlands or moves sluggishly to the saltwater marshes due to the flat terrain, sandy soils and the absence of impervious surface.

The area, land use(s), drainage tributary(s), and outfall location(s) for the sub-basins in the North Basin are shown in [Table 4.4.4-3](#).

### **Cainhoy Area**

The study limits of the Cainhoy area north of the Daniel Island peninsula encompasses approximately 41,500 acres, extends from the east and west portions of the Mark Clark Expressway and Beresford Creek, respectively, up to the south end of the Francis Marion National Forest, and from the west and east banks of the Cooper and Wando rivers, respectively (see [Figure 4.4.4-2](#)). Approximately 23,300, 16,500 and 1,700 acres of the study area are located in the Cooper, Wando and East Branch Cooper River watersheds respectively. The boundaries for these three watersheds were determined from the Watershed Water Quality Management Strategy for the Catawba-Santee Basin (SCDHEC, 1995), and verified with United States Geological Survey (USGS) Quadrangle Maps (Charleston, S.C., revised in 1983; North Charleston, S.C., revised in 1979; and Cainhoy, S.C., revised in 1971).

The majority of the land use/land cover within the study limits of the Cooper and Wando river watersheds consists of undeveloped woodland, wetlands and saltwater marsh along the banks of the Cooper and Wando rivers and their tributaries. Tracts of fallow farmland are located at the south end of the Wando River watershed north of the Mark Clark Expressway. The land use/land cover within the study limits of the East Branch Cooper River Watershed consists exclusively of undeveloped woodland and wetland.

Urban development has historically been limited within the Cainhoy area but has increased significantly since the completion of I-526. The largest concentrations of commercial and residential development are located at the south end of Clements Ferry Road near the Mark Clark Expressway for both watersheds and the town of Cainhoy at the north end of the Wando River Watershed near Highway S.C. 41. The largest industrial facilities in the study area are the Amoco and Nucor plants at the northwest end of the Cooper River watershed near Flag and Grove Creeks, respectively, and the Mikasa plant located on Clements Ferry Road north of Beresford Creek (Wando River watershed).

Since residential, commercial and industrial development is sparse, high volumes of runoff from impervious surfaces is limited. The natural topography in the large undeveloped areas is the limiting factor affecting drainage. The land is generally level with slight undulations. Sharp breaks in topography occur along tidal streams and marshes. The elevations at the basin divides between the Cooper and Wando river watersheds start at approximately 10 feet NGVD, 1929 and gradually increase to 50 feet NGVD, 1929 at the East Cooper River Watershed in the Francis Marion National Forest. Runoff drains from these basin divides down heavily vegetated mild slopes ranging from 0.5 to 1.5 percent. Ponding occurs in depressed areas as a result of these broad, flat, heavily vegetated natural drainage paths.

The soils are generally poorly drained except those at the ridges in the central portions along the basin divides. Moderately well drained soils are located at the ridges at the north end of the Cainhoy area. These soils are sandy throughout or have a sandy surface and loamy subsoil. There are poorly drained soils near and within the saltwater marshes and at the southern end of the Cainhoy area. These soils are loamy throughout or have a loamy surface and a clayey subsoil (U.S. Soil Conservation and Forest Service, January 1980).

Runoff discharges into tidal tributaries of the Cooper and Wando rivers which are subject to tidal fluctuations. The higher upland areas in the interior drain to these tidal tributaries at higher elevations, so the fluctuations does not significantly influence runoff. The tidal effects in the Cooper and Wando rivers are very complex, highly variable, and depend on the force, direction, duration of winds, and other meteorological events occurring seaward (see [Section 4.17](#) Hydrology and Water Quality for tide information).

The area, land use(s), drainage tributary(s), and outfall location(s) for the Cooper, Wando and East Cooper river watersheds are shown in [Table 4.4.4-4](#).

### **Stormwater Management**

The City of Charleston, Berkeley County and the SCDHEC regulate stormwater management facilities with regards to peak attenuation. Stormwater quality is regulated by the SCDHEC in the City of Charleston and Berkeley County.

The SCDHEC requires detention ponds within one-half mile of a receiving water body in the coastal zone to store the first one-half inch of runoff from the entire site or store the first one inch of runoff from the built-upon portion of the property, whichever is greater (Environmental Quality Control Bureau of Water Pollution Control, September 1995). Water quality requirements are satisfied because the majority of pollutants coming off the site such as oils, greases, fertilizers and pesticides are contained in the first one-half to one

inch of runoff. The pollutants are removed from the stormwater as the stormwater percolates into the ground.

The detention ponds also function as water quantity systems by capturing the runoff from the site and releasing at a rate not to exceed the pre-development rate of runoff. The City of Charleston requires that post-development peak flows can be no greater than pre-development peak flows for the 10-year, 24-hour storm event in residential and light commercial areas. The SCDHEC requires post-development release rates from the basin shall be at or below pre-development rates for the 2- and 10-year, 24-hour storms. The City of Charleston also requires the following with respect to water quantity:

- Maximum water levels for the 25 year storm will allow roads to remain passable.
- Maximum water levels for the 100 year storm will be below minimum building floor elevations.
- Impact of the fully developed basin on downstream and upstream properties will be identified.

A discussion of the existing water quality treatment facilities for stormwater management on Daniel Island and in the Cainhoy area follows.

### **Daniel Island Peninsula**

Currently, eight wet detention ponds and two wetlands at the Daniel Island Residential/Commercial Community are the only permitted stormwater facilities on Daniel Island. The Storm Drainage Master Plan for the Daniel Island development indicate seven and three additional ponds for the future build out conditions at the residential/commercial area and the Bishop England School site, respectively. The acreage, basin area and facility served and receiving tributary of the detention ponds in the Daniel Island residential/commercial development and the Bishop England School are shown in [Table 4.4.4-5](#).

There are no water quality treatment facilities for runoff from farmland areas in the North Basin. Therefore, the greatest threat to water quality in the North Basin is from pesticides and fertilizers utilized in agricultural production. Erosion of topsoil from exposed farmland may also contribute to excessive turbidity in the receiving waters.

The 17 flash board risers around the perimeter of the of the South Basin are permitted with the OCRM as a Direct Critical Area Permit. (see [Table 4.4.4-2](#), previously referenced). Dredged material deposited within the Wando, Middle, West and Central Cells in the South Basin of Daniel Island consist primarily of fine sands, silts and clays (U.S. Army Corps of Engineers, February 1996). The dikes along the perimeter of the South Basin contain the silty material and the outfall flash board risers slowly release the stormwater into the Cooper River, Wando River and manmade canal draining to both rivers. The slow release of runoff allows suspended sediments to settle to the bottom. The cells function as settling basins, trapping sediments prior to discharge to the Cooper and Wando rivers.



## **Cainhoy Area**

Water quality treatment facilities designed for stormwater control under the current requirements mandated by SCDHEC and Berkeley county are located on properties developed after October 1991. Prior to October 1991, the SCDHEC did not regulate water quality and quantity for new development. The SCDHEC and Berkeley County do not have records on water quality treatment facilities (i.e., retention/detention ponds) constructed before 1991. Therefore, the discussion on existing water quality management facilities is limited to the development after 1991 (Mikasa plant, Cainhoy Park and Clements Ferry Industrial Park). According to the SCDHEC these are the only developments within the study limits with water quality treatment facilities permitted under existing regulations. All three sites are located on Clements Ferry Road ([Figure 4.4.4-2](#)).

The permit and a site inspection of the Mikasa Plant indicates the stormwater treatment facilities consist of four interconnected detention ponds. An additional pond is required prior to project build-out. The ponds outfall into freshwater wetlands to the north. The acreage, basin area facility served and receiving tributary of the 4 existing permitted detention ponds in the Mikasa Plant development are shown in [Table 4.4.4-6](#).

The permits for Cainhoy Park and the Clements Ferry Industrial Park were not reviewed. A site inspection of the facilities and discussions with the SCDHEC personnel involved in permitting, indicate one detention pond at each site. The detention pond at the Cainhoy Industrial Park is designed to handle the water quality and treatment requirements for the entire development. However, the existing pond at the Clements Ferry Industrial Park is designed to handle the water quality and treatment requirements for a particular facility only. Additional detention ponds are required for future development. The Cainhoy and Clements Ferry Industrial Park outfall into saltwater marsh tributaries draining to Clouter Creek.

### **4.4.4.3 Naval Base**

The Charleston Naval Base is a 1,575 acre complex located within the corporate limits of the City of North Charleston, South Carolina (see [Figure 4.4.4-3](#)). The Base is situated on the Cooper River, approximately three miles above its confluence with Charleston Harbor. In the vicinity of the Charleston Naval Base, two small tidal creeks, Noisette and Shipyard creeks, flow into the Cooper River. Noisette Creek is a small tidal drainage way near the northern edge of the Base. Shipyard Creek is a larger tidal creek that bounds the Base to the south. A shipping channel is maintained by the USACOE in the downstream portion of Shipyard Creek. Although its shores are undeveloped along the Base, Shipyard Creek is utilized by several industrial operations along its southern shores.

The Charleston Naval Base is developed with a high percentage of impervious land surface and served by old drainage and water quality treatment systems. Drainage patterns at the Base were determined from existing drainage maps depicting schematics of the storm sewer system and site investigations. The drainage maps were developed by the Department of the Navy in 1975. Changes to the storm sewer system since 1975 are unknown. However, the majority of the Base was developed and major conveyances of the storm sewer were constructed by 1975. Therefore, any change to the storm sewer system since 1975 appears to be minor, and major drainage patterns were not disrupted.

## **Drainage**

Stormwater runoff is collected in closed storm sewer systems and open drainage ditches and transported either to the Cooper River, Noisette Creek or Shipyard Creek through 102 outfalls. The majority of the storm sewer is composed of reinforced concrete pipe. Some of the smaller systems are a combination of reinforced concrete, cast iron, ductile iron and corrugated metal pipe. There is no single stormwater collection system servicing the Charleston Naval Base. Instead there are numerous local systems of inlets, pipes, and ditches which transport the runoff by gravity to the nearest natural drainage channel or waterway. These drainage systems were constructed throughout the years as the Naval Base expanded. Many of the storm sewer systems are inter-connected and appear to be inadequate based on the size of the drainage pipes and comments from personnel with the Charleston Naval Complex Redevelopment Authority.

The Charleston Naval Complex Redevelopment Authority indicates flooding results from moderate to heavy rainfall because of small pipe sizes, poor sub-surface soils and high tides. Flooding has been reported along the western boundary of the Charleston Naval Base near Spruill Avenue and at the Base entrance along McMillian Avenue.

Currently, storm sewers in the jurisdiction of the City of North Charleston require storm sewer systems to handle storm water runoff for the 10-year, 24-hour storm event. The existing storm sewer systems were probably designed to handle storm events less intense than the 10-year, 24-hour storm event based on their age and pipe diameter. The existing storm sewer schematic shows pipe diameters ranging from 8 to 24-inches conveying runoff from large areas with impervious surfaces.

The existing sub-surface soils at the Charleston Naval Base are unable to support the underground piping network of the storm sewer. The primary trunk lines of the storm sewer were supported by timber piles to alleviate settling. However, the lateral storm sewer lines connected to the main trunk lines are supported only by the sub-surface soils. The poor sub-surface soil conditions allow the lateral lines to settle and leak. Consequently, water backs up and floods upstream areas. High tides have a similar influence on upstream flooding.

The Charleston Naval Base was divided into a North, Central and Southern Section for this discussion (see [Figure 4.4.4-3](#)). The area, primary land uses, average elevations, drainage patterns, outfalls and receiving body of waters for the North, Central and Southern Sections are discussed below and summarized in [Table 4.4.4-7](#).

The North Section is approximately 80 acres, bounded to the east by the Cooper River, the West by Virginia Avenue, the north by North Sixth Street, and the south by Noisette Creek. Elevations range from approximately 10 feet NGVD, 1929 at the west end and to less than 5 feet NGVD, 1929 in the saltwater marsh along the banks of the Cooper River and adjacent to Noisette Creek. Large amounts of impervious surface associated with a warehouse and industrial areas are located at the east end along the Cooper River. The banks along the Cooper River are undeveloped and contain narrow strips of saltwater marsh. The west end of the North Section is less developed, contains more open grass areas around parking areas



and buildings and contains saltwater marsh along the Banks of Noisette Creek. The drainage system at the east end conveys stormwater from west to east and discharges into the Copper River through eight outfalls. The drainage system at the west end conveys runoff from north to south and discharges into Noisette Creek at five outfalls.

The Central Section includes approximately 1,045 acres and is the largest of the three sections. The Central Section is bounded by Noisette Creek to the north, the Cooper River to the east, Halsey Street to the south and Spruill Avenue to the west. Elevations range from approximately 5 to 10 feet NGVD, 1929 in the majority of the Central Section. However, elevations are up to 25 feet NGVD, 1929 at the administration and community facilities north of McMillan Avenue and east of St. Johns Avenue and up to 20 feet NGVD, 1929 in the residential housing areas south of the old golf course at the north end of the base. The majority of the Central Section is developed with residential housing, administrative offices, industrial, warehouse and ship maintenance facilities. Most of the coastline along the Cooper River is developed with shipping berths, docks and concrete bulkheads. The abandoned golf course south of Noisette Creek and the sparsely developed area north of Hasley Avenue contain the largest areas of pervious surface. Most of the drainage systems in the Central section consist of a series of closed storm sewer systems draining stormwater from west to east and discharging into the Cooper River through 43 outfalls. Stormwater runoff in the abandoned golf course is conveyed north and discharges into Noisette Creek through nine outfalls.

The South Section is approximately 450 acres, bounded to the east by the Cooper River, the West by Spruill Avenue and Shipyard Creek, the north by Hasley Street, and the south by the Cooper River. Elevations range from approximately 5 to 12 feet NGVD, 1929 in the majority of the South Section. The highest elevations are located at the spoil area at the south end. The South Section is heavily developed with commercial, administrative offices, industrial, warehouse, and ship maintenance facilities at the east end along the banks of the Cooper River. The southern portion adjacent to Shipyard Creek and the Cooper River is sparsely developed and includes a large spoil area. The drainage system in the developed areas consists of closed storm sewer systems conveying runoff from west to east and discharges into the Cooper River through 28 outfalls. Runoff in the undeveloped portions at the southern end sheet flow to the south and discharge into the Cooper River through eight culverts under Juneau Avenue. Runoff from a developed area located on the west side north of the spoil area drains to a closed storm sewer system that discharges to Shipyard Creek through one outfall.

### **Stormwater Management**

The stormwater management for water quality and quantity in the City of North Charleston follow the same regulations as the City of Charleston and the SCDHEC. However, the City of North Charleston is currently developing a stormwater master plan that could lead to a revision in their criteria. The date when the stormwater master plan is expected to be completed and approved by City Council has not been set.

Water quality treatment facilities are limited in the Charleston Naval Base because the Base was developed prior to the current water quality regulations established by the SCDHEC. The only stormwater water quality treatment facilities consist of two large interconnected retention ponds along McMillan Avenue and a retention pond in the abandoned golf course.

The two large retention ponds along McMillain Avenue are approximately 2.0 acres and receive stormwater from approximately 35 acres in the parking areas south of McMillian Avenue and from an unknown amount of off-site urban areas west of the Base. Stormwater enters the ponds by gravity flow through two inlets and from a pumping station on McMillian Avenue. The outfall from these ponds discharges into a storm sewer which eventually discharges into the Cooper River.

The retention pond in the abandoned golf course is approximately 0.4 acres and receives stormwater runoff from approximately 7.0 acres. Stormwater from unpaved areas enters the pond at two inlets and discharges directly into Noiset Creek. The discharge structure is equipped with a flood gate for flood control.

The acreage, basin area and facility served and receiving tributary of the three stormwater ponds located at the Charleston Navy Base are shown in [Table 4.4.4-8](#).

#### **4.4.4.4 Columbus Street Terminal**

The Columbus Street Terminal is a 160-acre complex located within the corporate limits of the City of Charleston, South Carolina (see [Figure 4.4.4-1](#)). The Columbus Street terminal is adjacent to Town Creek approximately 6,000 feet south the confluence of the Cooper and Wando rivers. Town Creek connects the Cooper River to Charleston Harbor.

Drainage patterns and physical components of the drainage systems at the Columbus Street Terminal were determined from an existing drainage map depicting a schematic of the storm sewer system. The Columbus Street Terminal is developed with a very high percentage of impervious land surface and served by old drainage systems. Sub-basin delineations and outfall locations were based on the layout of the existing storm sewer systems for the Columbus Street Terminal. The layout of the existing storm sewer is based on dye tests conducted by SCSPA engineering personnel because construction plans depicting the storm sewer system were not available. Therefore, pipe material and sizes are unknown.

Existing drainage patterns were determined, and an inventory of existing outfalls and water quality treatment facilities were compiled.

#### **Drainage**

Stormwater runoff is collected in several closed storm sewer systems and transported to Town Creek through 22 outfalls (see [Figure 4.4.4-4](#)). The storm sewer system is old and appears to be inadequate based on observations made on a site visit during a heavy storm. The hydraulic grade line appeared to be above the existing ground elevation as evidenced by large puddles of water surrounding most inlets. This may be a result of small pipes, inadequate pipe slopes, high invert elevations, high tides from Town Creek and small inlet openings. Most of the water drained away shortly after the rainfall stopped. However, standing water remained in several depressed areas on the north side of the terminal in the container storage yard.

The majority of the Columbus Street Terminal is impervious and consists of storage yards, maintenance areas, shipping berths, parking lots, rail corridors, streets and administrative offices. The asphalt and

concrete surfaces are graded such that the stormwater drains to the nearest storm sewer inlet. All of the storm sewers conveyed the stormwater west to Town Creek.

### **Stormwater Management**

The SCSPA was required to develop a Stormwater Pollution Prevention Plan (SWPPP) for the Vehicle Maintenance and Equipment Cleaning Area. The SWPPP is a requirement of the National pollutant Discharge Elimination System (NPDES) permit for industrial facilities. The NPDES permit number for the Columbus Street Terminal is SCR000183.

The SWPPP for the Columbus Street Terminal was prepared in accordance with good engineering practices. The plan identified potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of the permit. The contents of the SWPPP include: the pollution prevention team, potential pollutant sources, inventory of exposed materials, best management practices, and compliance evaluation. The SWPPP is required to be retained on site and amended whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the Cooper River.

#### **4.4.5      Fire, Police, and Emergency Medical Services**

##### **4.4.5.1      Fire Protection**

### **Shipboard Firefighting Capabilities**

The last major fire that utilized tug boat services was approximately 9 years ago at the Hess terminal. The water borne firefighting vessel left the area with the closing of the Naval Base. There are two main tug boat companies that offer service to marine cargo ships. They are: McAllister Towing of Charleston - 50 Immigration Street and Whitestack Maritime Corporation - between Union Pier and the Aquarium and is moving to the former Naval Base. McAllister has 4 tugs (2 tugs with fire monitors and can pump 1,200 to 1,800 gallons per minute). Whitestack has 4 tugs and are building a fifth tug. All tugs with Navy approved fire monitors can pump 2,000 gallons per minute. The fifth tug is a z-drive tug, which has better maneuverability and will possibly have an around the clock crew.

If tugs are asked to assist with a fire, the warm-up times of the tugs become important to the response time to that emergency. In the summer, tugs need approximately an hour to warm-up and in the winter they need at least an hour. De-watering pumps do not allow the ship to sink or tip over and a monitor helps to keep track of that stability. Fire departments take tours of the cargo ships to get familiar with the size and confined spaces in which they would have to work. Fire departments are considering adaptors for their hoses to connect to the tug pumping systems.

### **Berkeley County**

There are 45 fire stations in Berkeley County with an average response time from these stations being 3 to 4 minutes. [Table 4.4.5-1](#) indicates there are 82 paid and 505 volunteer firefighters in the county.

Approximately 0.56 paid and 3.42 volunteer firefighters are in employment for every 1,000 Berkeley County residents. Mutual fire agreements are in place when assistance is needed. Cainhoy Rural Fire Department has 4 pumper and 3 tanker trucks. Goose Creek Rural Fire Department has a hazardous materials team. [Figure 4.4.5-1](#) shows those Berkeley County fire departments in the project study area.

There are 2 fire stations in the City of Hanahan with an average response time of these stations of 4-6 minutes. There are approximately 24 paid and 2 volunteer firefighters in the city. There are approximately 1.71 paid and 0.14 volunteer firefighters employed for every 1,000 City of Hanahan residents. The City of Hanahan does not have a hazardous materials team. As a standard, current stations are located within a 2.5-mile radius of residential areas.

### **Charleston County**

There are 59 fire stations in Charleston County. The average response time from these stations is approximately 3 minutes. [Table 4.4.5-1](#) indicates 753 paid (full-time) and 164 volunteer firefighters in Charleston County. Approximately 2.36 paid and 0.51 volunteer firefighters are in employment for every 1,000 Charleston County residents. [Figure 4.4.5-1](#) presents those Charleston County fire departments located in the study area.

There are 18 fire stations in the City of Charleston. Average response time from these stations is 2 minutes. There are 185 paid firefighters in the city. There are approximately 1.88 firefighters employed for every 1,000 City of Charleston residents. City of Charleston Fire Stations #18, #22 and #6 are responsible for Daniel Island. Cainhoy Rural #4 Fire Station is just north of Station #18 and would be the next source of fire prevention in Berkeley County/City of Charleston. Mutual fire agreements are in place when assistance is needed. Engines #6, #8, Truck #4, Car #3 of the City of Charleston's Fire Department serve the Columbus Street Terminal. Engines #2, #3, Truck #4, Car #2 of the City of Charleston's Fire Department serve Union Pier. The City of Charleston's Fire Department has 16 engine/pumper trucks (4 reserve), 3 ladder trucks, 1 rescue truck, 1 confined space truck and 1 hazardous materials truck with a 25-member team. The location of the fire stations depends on the location of residents. Fire stations for the City of Charleston are located within a 2.5-mile radius of a residence. The City of Charleston has 1 station currently in the planning stages to be located on Daniel Island in 1998.

There are 10 fire stations in the City of North Charleston. There are 151 paid and no volunteer firefighters in the city. There are approximately 1.96 firefighters employed for every 1,000 City of North Charleston residents with an average response time from these stations in the city within 3 minutes. Mutual agreements are in place with the City of North Charleston and surrounding areas. North Charleston Port Terminal is served by stations #1 and #3. Engines #1 and #3, Truck #3, Service #1 and #3 and one Battalion Chief from the City of North Charleston Fire Department are the responding equipment to the North Charleston Port Terminal. The department has full hazardous materials capabilities and responds as a department not as an independent hazardous materials team. The equipment of the North Charleston Fire Department includes the following: 15 engines, 3 ladder trucks, 1 hazardous materials unit, and 1 rescue unit and trailer. The City of North Charleston has no specialized fire fighting capabilities other than normal fire department response. Normal fire fighting response and techniques are administered at the berth. Built upon area of the city requires the first engine company be within 1.5 miles of any building and a ladder and/or service company within 2.5 miles of any building requiring a ladder or service company response.

The Town of Mount Pleasant has 5 fire stations. There are 71 paid and 10 volunteer firefighters in the city. Approximately 1.78 firefighters are employed for every 1,000 residents. The average response time from these stations is 3 minutes. Three engines, 1 ladder, and a chief are the equipment and personnel to respond to a call. Mount Pleasant has a hazardous materials trailer that can be attached to any engine for mobilization. All paid firefighters are trained to operate the hazardous materials trailer. Standards for a fire station location are within 2.5 miles of a residence. The recently moved Mount Pleasant Fire Station #2 is located on Egypt Road and is the closest fire station to the Wando Terminal. This station would also provide mutual aid, if needed, to Daniel Island. The Wando Port Terminal is served by three engines and one ladder from the Mount Pleasant Fire Department.

### **Dorchester County**

There are 20 fire stations in Dorchester County with an average response time from these stations of 6 to 10 minutes in suburban areas and 10 to 20 minutes in rural areas. [Table 4.4.5-1](#) shows the 112 paid and 192 volunteer firefighters in the county. Approximately 1.18 paid and 2.03 volunteer firefighters are employed for every 1,000 Dorchester County residents.

The Town of Summerville Fire Department has a limited hazardous materials team. There are no additional fire stations, personnel, or equipment to be planned, relocated, or closed due to any population changes or other standards in the county.

There are no fire departments from Dorchester County located in the study area.

#### **4.4.5.2 Police**

### **Berkeley County**

Berkeley County Sheriff's Department has 77 sworn officers and 26 civilian employees. Berkeley County has about 0.81 sworn officers employed for every 1,000 citizens. The average response time to an emergency call is approximately 19 minutes in the county and approximately 35 minutes to Daniel Island. [Figure 4.4.5-1](#) displays the Berkeley County law enforcement offices in the study area.

The Berkeley County Sheriff's Office in Goose Creek serves Daniel Island. On any given 12-hour patrol shift, there are no more than 10 sheriff deputies patrolling the county. Four deputies are assigned to patrol the northern portion of the county and six deputies are assigned to patrol the southern part of the county - primarily in Goose Creek and Summerville, which are the highest populated areas of the county. Berkeley County does not have substations throughout the county. All deputies report to the Sheriff's office headquarters located in Moncks Corner. The Sheriff's office adds additional law enforcement personnel based on population, response times, coverage area and by approval of Berkeley County Council. In addition to the Sheriff's Department, which serves the entire county, there are city police departments in the county. [Table 4.4.5-1](#) summarizes the number of law enforcement officers in Berkeley County.

The City of Hanahan Police Department has 21 sworn officers and 7 civilian employees. The City of Hanahan has approximately 1.5 sworn officers employed for every 1,000 citizens. Hanahan has a low crime

rate; however, growth from the surrounding urban areas lead the police department to believe that they would eventually have to add sworn officers. Generally, there are three patrol officers on the streets of Hanahan on any given patrol shift.

### **Charleston County**

The Charleston County Sheriff's Department has 235 deputy sheriffs and 110 civilian employees. The Sheriff's Department serves only unincorporated areas, but has county-wide jurisdiction. Charleston County Sheriff's Department has approximately 0.74 sworn officers employed for every 1,000 service population. In addition, there are three city police departments operating in the project study area: Charleston, North Charleston, and Mount Pleasant. [Figure 4.4.5-1](#) displays the Charleston County law enforcement offices in the study area.

The City of Charleston Police Department is responsible for the city limits which includes the Daniel Island area northward through the Cainhoy Peninsula. The City of Charleston Police Department has 322 sworn officers and 106 civilian employees. The police force of the City of Charleston is about 3.28 sworn officers employed for every 1,000 citizens.

The North Charleston Police Department has 210 sworn officers and 83 civilian employees. North Charleston has about 4.0 law enforcement personnel for every 1,000 citizens.

The Town of Mount Pleasant Police Department has 78 sworn officers and 37 civilian employees. The Town of Mount Pleasant has about 2.11 law enforcement personnel for every 1,000 citizens. [Table 4.4.5-1](#) summarizes the number of law enforcement officers in Charleston County.

### **Dorchester County**

Dorchester County Law Enforcement has about 135 sworn officers and 20 civilian employees. This department serves the entire county. Dorchester County Law Enforcement has approximately 1.42 sworn officers employed for every 1,000 citizens.

There are no Dorchester County police facilities in the vicinity of the Proposed Project.

### **South Carolina State Ports Authority Police**

The South Carolina State Ports Authority Police Department has 52 law enforcement officers. Each terminal averages 13 officers and at least one officer at the gate and one patrol officer on the terminal facility 24 hours a day. The Chief of Port Police maintains a close working relationship with all surrounding law enforcement departments. Primary responsibilities of the Port Police are to protect lives and property, provide police services during all emergencies and accidents, monitor and provide traffic flow, investigate accidents and thefts, enforce all state laws, perform gate searches, provide fire watch, serve warrants, and provide stow-away/gang way watch on demand. The Chief, captain, sergeants, corporals, and patrolmen are all certified state constables and are equivalent to State Highway Patrol Troopers. Therefore, their jurisdiction is statewide, but for practical purposes it is limited to SCSPA facilities. In addition, the chief, captain, and senior sergeants are U.S. Marshals.

#### **4.4.5.3 Emergency Medical Services**

##### **Berkeley County**

There are 15 rescue squads in Berkeley County stationed in various locations covering Berkeley County. Berkeley County Emergency Medical Services (EMS) maintains nine ambulances, three quick response vehicles (one with heavy rescue capabilities), two spare Medic units, and one mass casualty unit. Medic # 7 Cainhoy is the primary responder to Daniel Island, while Medic #11 Hanahan City provides secondary response. Berkeley County EMS will, as needed, request support from the Meducare Helicopter at the Medical University of South Carolina in Charleston. Meducare lands on-scene or at one of 70 designated landing zones within the county. Landing zones are guided by where an accident occurs. There are designated landing zones at Amoco Chemical, Nucor, and at the new EMS station (1998) on Highway 98. [Table 4.4.5-1](#) indicates that rescue squads have a total of 49 full-time employees, 26 part-time employees and up to 20 volunteers with an average response time of typically 10 minutes. East Cooper Hospital, the Medical University of South Carolina, and Roper Hospital are the primary recipients of people involved in medical emergencies encountered in a terminal type atmosphere. [Figure 4.4.5-1](#) shows the locations of hospitals in the study area. These hospitals combined have over 1,100 beds for medical service. There are 8 secondary hospitals that would be involved in overflow from a large incident. Standards for additional hospitals are based upon population growth. Berkeley County Fire Departments are also part of the EMS system. Additional standalone rescue squads are not likely. Both Fire and EMS rescue squads are moving toward a dual roll of emergency medical services. EMS should have a dual unit station in Cainhoy by the end of 1998. Only one unit will operate from this station until area growth dictates a need for an additional unit. This station will also include an office for the Sheriff's department and classroom facilities for Trident Tech to provide industrial training.

##### **Charleston County**

There are approximately 16 units of emergency squads in Charleston County. [Table 4.4.5-1](#) indicates that these squads have a total of 114 full-time field personnel and 34 part-time personnel. Average response time is typically 6 to 7 minutes. Four major hospitals, Charleston Memorial, Roper, Veterans Administrative Medical Center, and the Medical University of South Carolina concentrated in the medical district, receive the majority of patients. [Figure 4.4.5-1](#) shows the locations of Charleston County hospitals in the study area.

##### **Dorchester County**

Dorchester County rescue squads are stationed in Oakbrook/Ladson, Summerville, Ridgeville, and St. George. [Table 4.4.5-1](#) indicates that Dorchester County emergency squads have a total of 25 paid and 25 part-time employees. Average response time is typically 10 minutes in suburban areas and 15 minutes in rural areas. Summerville Medical Center, Colleton Regional Medical Center, and Orangeburg Regional Medical Center are the primary recipients of people involved in medical emergencies.



#### **4.4.6      Schools**

The Bishop England School is the only private school noted in this EIS because it is the only private school potentially impacted by any portion of the project.

##### **4.4.6.1      Berkeley County**

Berkeley County is one school district with 35 schools (19 elementary, 9 middle, 6 high schools, and 1 career center). Berkeley County schools located in the project study area are presented in [Figure 4.4.6-1](#). As shown in [Table 4.4.6-1](#), total school enrollment is 26,051 students. Average daily attendance for the school year 1997-1998 was approximately 25,342. Berkeley County public schools are operating at approximately 97 percent capacity during the 1998 school year.

Student numbers have fluctuated since the 1991/1992 school year. A decrease of over 2,100 students occurred in the 1995 and 1996 school years. This large decrease in numbers is due in part to the closure of the Naval Base. However, the 1997/1998 school year showed an increase of 204 students. Berkeley County School District predicts that student growth to be 1 percent per year for the next 10-20 years. The district is at capacity except for 3 schools on the U.S. Naval Reservation. All schools, with the exception of those on the Naval Weapons Station, have portable classrooms. Schools in the rural areas have the least amount of overcrowding. Additional school facilities are planned and constructed when the existing schools are overcrowded. Recently constructed is a new K-5 school in Hanahan and a 5-8 middle school in Macedonia. These two schools are replacing existing schools. The Berkeley County School District is planning to build an elementary school on Daniel Island; however, the location of this school facility has not been determined.

The student-teacher ratio for the district equals 22 to 1 (Grades 1-3), 27 to 1 (Grades 4-8), and 27 to 1 (Grades 9-12). Berkeley County's goal for student-teacher ratio in 1998/1999 is 21 to 1 (Grades 1-3), 26 to 1 (Grades 4-8), and high schools have remained the same since they decreased their ratio in 1997/1998.

There are no public schools located in the Cainhoy Peninsula. Students who live in the Daniel Island community and the Cainhoy Peninsula are part of the Berkeley County School District. Daniel Island students attend Hanahan Elementary, Hanahan Middle, and Hanahan High schools. Those students who live outside the Daniel Island community attend Cainhoy Elementary, Cainhoy Middle and Hanahan High schools.

School bus transportation is provided throughout Daniel Island and the Cainhoy Peninsula. Currently, each public school has one school bus to transport students from the Daniel Island Community to each public school. An additional bus is possible for the 1998/1999 school year for those high school students in the Daniel Island community attending Hanahan High School.

As of the 1995-96 school year, there are 6 private schools in Berkeley County with approximately 576 students enrolled. Bishop England High School is a private school that opened in August 1998. The new school is located adjacent to the southern portion of the Daniel Island community along Daniel Island Drive. Approximately 1,000 students and 200 faculty/staff members are attending this parochial school.



There are no colleges or universities on Daniel Island or on the Cainhoy Peninsula.

#### **4.4.6.2 Charleston County**

Charleston County is made up of eight school districts with 75 schools (44 elementary, 15 middle, 10 high schools, 5 special education satellite facilities, and a vocational school). Charleston County has three school districts surrounding Daniel Island as shown in [Figure 4.4.6-1](#): Districts #2 (Town of Mount Pleasant), #4 (City of North Charleston), and #20 (City of Charleston). The district has more than 5,200 employees, including 2,800 teachers. As shown in [Table 4.4.6-1](#), 43,454 students were enrolled in the county school district during the 1996/1997 school year. The average daily attendance for the school district was 43,454 during the 1996/1997 school year, and 41,752 during the 1997/1998 school year. The teacher-student ratio for the Charleston County school system equals 2:23 (kindergarten), 1:21 (Grades 1-3), 1:30 (Grades 4-5), 1:25 (Grades 6-8), and 1:25 (Grades 9-12). The average student-teacher ratio for the district is approximately 24 to 1. Overall, Charleston County public schools are currently operating at approximately 96 percent capacity. For the past five years, the Charleston County School System number of students has decreased by 3,173 students. In the next 10 years, the school district predicts a further decline by 2,072 students.

The Master Plan for the Charleston County School District calls for 2 elementary schools to handle growth/overcrowding at certain districts: one elementary school in East Cooper (Mount Pleasant) and one middle school in West Ashley on Highway 61 near Drayton Hall Middle School. The county-wide Master Plan is to remove all portables with renovations and additions.

As of the 1995-96 school year there were approximately 35 private schools in Charleston County. The total enrollment of private schools for Charleston County is approximately 7,387.

The Citadel is a public, coeducational college that offers degrees in a variety of programs. Established in 1842 and located along the Ashley River, the Citadel has an undergraduate student enrollment of between 1,800 - 2,000.

The Medical University of South Carolina (MUSC) was established in 1824 as a private school that has expanded to a medical center with six colleges for the education of a broad range of health professionals, biomedical students, and other health-related personnel. MUSC was one of the first medical schools in the U.S. to establish an infirmary specifically for teaching purposes. Student enrollments were approximately 2,300 students in the fall of 1994 (not including post doctoral residents in medicine, dental medicine, and pharmacy) with a full-time faculty of over 1,000.

The College of Charleston is a state-supported comprehensive institution providing education in the arts and sciences, education, and business. The College has two locations, one in the historic district of Charleston and the other in North Charleston. The college has an enrollment of 8,000 to 9,000 undergraduate students and 2,000 graduate students.

Trident Technical College (TTC) is one of the largest technical colleges in South Carolina. TTC has an enrollment of 9,100 students at its three campuses. The main campus is located in North Charleston and the other two are located in downtown Charleston and Moncks Corner.

#### **4.4.6.3     Dorchester County**

Dorchester County has two school districts: District 2 and 4. Dorchester County School District #2 is located in the southeastern half of the county and has 16 schools (8 elementary, 4 middle, 2 high schools, a school of arts and a community school). As shown in [Table 4.4.6-1](#), total school enrollment for the year 1997 was 16,297 students. Average daily attendance was 15,217 students for the school district. The district can handle a maximum capacity of 17,500 students before having to add trailers. Dorchester County School District #2 has a student-teacher goal of approximately 23 to 1. Currently, there are no additional school facilities planned in the Dorchester County School District #2.

District #4 is located in the northwestern half of the county and has 7 schools (3 elementary, 1 middle, 2 high schools, and a career school). As shown in [Table 4.4.6-1](#), total school enrollment is 2,500 students. Average daily attendance was 2,480 during the 1998-1999 school year.

The teacher-student ratio for the Dorchester County school system equals 1:21 (elementary schools), 1:23 (middle schools), and 1:25 (high schools).

The number of students added to the Dorchester County school system per year is 350-500. It operated at approximately 100 percent of capacity during the 1998-1999 school year. Portables and additional schools are planned and constructed when the existing schools are overcrowded.

As of the 1995-96 school year, Dorchester County has 8 private schools with an enrollment of approximately 1,502 students. There are no colleges or universities in Dorchester County.

#### **4.4.7     Solid Waste Facilities**

This section summarizes the existing solid waste collection and disposal systems and recycling efforts utilized in the study area. Included in this summary is information regarding legislative requirements, public and private landfills and waste facilities, capacity, potential closure dates, and recycling services.

##### **4.4.7.1     Solid Waste Management Practices and Procedures**

During the 1996 legislative session, the South Carolina General Assembly approved the Solid Waste Regulation: R.61-107.15: Land Application of Solid Waste. Although this regulation was approved during the 1996 legislative session, it was not published in the *State Register* until July 26, 1996, and therefore did not become effective until FY 97. This regulation addresses the land application of non-hazardous solid waste on, or into soil that is being used for agricultural, horticultural, or silvicultural production, or to reclaim land for useful productivity.

The following two solid waste regulations approved during the 1995 legislative session became effective during FY96 upon publication in the *State Register* on July 28, 1995:

- Amendment to R.61-107.11: Construction, Demolition, and Land-Clearing Debris Landfills. This amendment allows more flexibility in the permitting requirements by defining four types of construction, demolition, and/or land-clearing debris landfills.

- R.61-107.279: Used Oil. This new regulation establishes the minimum standards for the proper management of used oil generated in the state, and contains standards for used oil generators, collection facilities, transporters, transfer facilities, processors, re-refiners, and burners. The regulation also addresses the disposal of used oil and oil filters. R.61-107.279 is consistent with the EPA Recycled Used Oil Management Standards.

During FY 95, the DHEC conducted an administrative self-audit of environmental quality control regulations and identified out-of-date regulations or regulations that have been subsequently suspended by statute or by more recent regulatory efforts. As a result of this audit, the following 5 solid waste regulations were repealed effective May 24, 1996:

- R.61-5, Disposal of Waste Pesticides and Pesticides Containers, which addressed solid waste and hazardous waste issues, was found obsolete. Solid waste issues previously addressed in R.61-5 are now regulated under R.61-107.258: Municipal Solid Waste Landfills, promulgated pursuant to the Solid Waste Policy and Management Act of 1991, SC Code Section 44-96-10 *et seq.* Hazardous waste issues are addressed in existing hazardous waste regulations.
- R.61-59, Milled or Shredded Refuse Disposal Sites. This regulation has been replaced and superseded by R.61-107.6, Solid Waste Processing Facilities, and was promulgated pursuant to the Solid Waste Policy and Management Act of 1991.
- R.61-60, Storage, Collection and Transportation of Solid Waste, and Permitting of Private Franchise Collectors. Replaced and superseded by R.61-107.5, Collection, Temporary Storage and Transportation of Solid Waste.
- R.61-61, Procedures to Close or Abandon a Solid Waste Disposal Area was replaced by other regulations and rendered obsolete. Requirements for closure of solid waste disposal areas are regulated under R.61-107.258, Municipal Solid Waste Landfills; R.61-107.13, Municipal Solid Waste Incinerator Ash Landfills; R.61-107.11, Construction, Demolition, and Land-Clearing Debris Landfills; R.61-66, Industrial Waste Disposal Sites and Facilities; and R.61-70, Sanitary Landfill Design, Construction and Operation.
- R.61-100, Non-Hazardous Solid Waste Management Planning became obsolete with the implementation of the County/Region Solid Waste Management Plans, pursuant to the Solid Waste Policy and Management Act of 1991.

During the 1996 Legislative Session, the General Assembly amended the Solid Waste Policy and Management Act of 1991 as it relates to short-term Construction and Debris (C&D) landfills. As amended, the Act now states that short-term C&D landfills are no longer required to submit a letter of consistency with the host county/region solid waste management plan. DHEC plans to amend R.61-107.11, Construction, Demolition, and Land-Clearing Debris Landfills to make the regulation consistent with the amended Act.

Currently, there are 5 publicly and 3 privately operated municipal solid waste landfills within the Tri-County area and 1 landfill is planned in Dorchester County. These landfills are augmented by 4 transfer stations and 1 incinerator. In FY 96, landfills in the Tri-County area received approximately 1,827,408 tons of solid waste. Residential land uses represented the largest percentage of waste generation with 40.5 percent (740,100 tons), followed by Commercial 21.0 percent (383,755 tons), Industrial 18.7 percent (341,725 tons), Construction and Demolition 7.3 percent (133,400 tons), Governmental 0.6 percent (10,964 tons), and

Others 11.9 percent (217,461 tons). (1997 Annual Progress Reports--Berkeley, Charleston, and Dorchester Counties; Berkeley County and Camp Dresser & McKee, Dorchester County Solid Waste Management Plan 1993-2013, February 1994).

#### **4.4.7.2 Solid Waste Collection Providers**

##### **Berkeley County**

Berkeley County provides residential solid waste collection through collection boxes and curbside service throughout unincorporated Berkeley County, the Town of Hanahan, and Goose Creek. Curbside service is provided to approximately 11,500 households.

##### **Charleston County**

Residential solid waste collection is provided by Charleston County in unincorporated sections of the county.

##### **Dorchester County**

Dorchester County provides residential solid waste collection through the maintenance of 18 collection boxes throughout the county. Approximately 6,100 households are provided service through these collection boxes.

##### **City of Charleston**

Citywide residential curbside service is provided by the City of Charleston.

##### **City of North Charleston**

Citywide residential curbside service is provided by the City of North Charleston.

##### **City of Mount Pleasant**

Citywide residential curbside service is provided by the City of Mount Pleasant.

#### **4.4.7.3 Private Solid Waste Collection Providers**

Several private solid waste collection companies provide residential collection services throughout the Tri-County area. CDS provides collection in Moncks Corner and households in unincorporated Dorchester County. BFI provides collection in Sangaree and unincorporated Dorchester County. Fennell, Waste Management, and Suburban service the remaining households in unincorporated Dorchester County. ATS provides collection services for Bonneau, portions of Berkeley and Dorchester counties, and households at the Charleston Naval Weapons Station. Commercial and industrial collection services are provided through individual contracts with these private collection services.

#### **4.4.7.4 Existing Solid Waste Disposal Facilities**

##### **Berkeley County Municipal Solid Waste Facility**

This facility (Facility No. 081001-1101/Permit No. DWP-105) is the only municipal solid waste (MSW) facility in Berkeley County and has a remaining capacity of approximately 223,000 tons. At its current rate of use, the anticipated closure date is October 9, 1998. During FY 97 (07-01-96 to 06-30-97), this facility disposed of 89,030 tons of solid waste, a -28.4 percent change from FY 96. Percentages by type for FY 97 were Residential 35 percent, Commercial 21 percent, Industrial 17, percent and Other 27 percent.

##### **Berkeley County Construction and Demolition (C&D) Debris Facility**

This facility (Facility No. 081001-1201) operates as the only dedicated C&D facility in Berkeley County. With a remaining capacity 4,722,000 tons, this facility is anticipated to close in December of 2144. During FY 97, this facility disposed of 39,986 tons of solid waste, a change of +91 percent from FY 96.

##### **Bees Ferry Municipal Solid Waste Facility**

Bees Ferry (Facility No. 101001-1101/Permit Numbers DWP-083/DWP-124) is the only MSW facility in Charleston County and has a remaining capacity of 1,879,000 cubic yards. At the current rate of use the approximate closure date is January 2006. During FY 97, this facility disposed of 113,022.69 tons of solid waste, a +10.6 percent change from FY 96. Percentages by type for FY 97 were Residential 67 percent and Commercial 33 percent. Charleston County is planning to permit a new municipal waste facility to replace the Bees Ferry facility; however, the majority of municipal waste in Charleston County is being incinerated at the Foster Wheeler incinerator (see [Section 4.4.7.6](#)).

##### **Chambers Oakridge Municipal Solid Waste Facility**

Chambers Oakridge (Facility No. 182400-1101/Permit No. DWP-130) is the only MSW facility in Dorchester County and has a remaining capacity of 5,108,000 tons. A closure date of September 2010 is anticipated at the current use rate. During FY 97, this facility disposed of 391,068 tons of solid waste, a +10 percent change from FY 96. Percentages by type for FY 97 were Residential 10 percent, Commercial 50 percent, and Other 40 percent.

#### **4.4.7.5 Transfer Stations**

There are 2 transfer stations in Charleston County: Mount Pleasant and Fennell Container Corporation. These facilities received 15 and 336 tons per day, respectively, during FY 97. Mount Pleasant transfers its waste to the Bees Ferry MSW Facility. Fennel Container Corporation transfers its waste to the Foster Wheeler Incinerator, Pepperhill Development Corporation Industrial Landfill, Collins C&D Landfill, and Chambers Oakridge MSW Facility.

In Dorchester County, there are 2 transfer stations: Fennel Container Corporation and Summerville. These facilities received 336 and 80 tons per day, respectively, during FY 97. Fennel Container Corporation transfers its waste to the Foster Wheeler Incinerator, Pepperhill Development Corporation Industrial Landfill,

Collins C&D Landfill, and Chambers Oakridge MSW Facility. Summerville transfers its waste to the Chambers Oakridge MSW Facility.

#### **4.4.7.6 Private Solid Waste Disposal Facilities**

Charleston County has 2 private solid waste disposal facilities: the Foster Wheeler Incinerator (Facility No. 102495-4001) and GS Roofing Products (Facility No. 103337-1601). The Foster Wheeler Incinerator received 221,745.31 tons in FY 97, a change of -1.3 percent from FY 96. Foster Wheeler only accepts untreated wood, large tree stumps, and yard waste. GS Roofing Products received 8,279 tons in FY 97, a +7.8 percent change from FY 96. GS Roofing only accepts waste from roofing and roofing-related activities.

There are 2 private solid waste disposal facilities and 1 planned private facility in Dorchester County. The existing facilities, Pepperhill Development Corporation and Hammond Wood Recycling, received 60,000 and 450 tons, respectively, during FY 97. Foster Wheeler accepts untreated wood, large tree stumps, yard waste, and municipal waste from Charleston County. Giant Cement Industries has a planned facility for on-site non-hazardous materials. This facility is in the planned stage and no opening date has been established.

#### **4.4.7.7 Recycling Services**

Recycling services within the study area are provided by Berkeley, Charleston, and Dorchester counties. Recyclable items include:

- Brown, green and clear glass
- Aluminum, steel and tin cans
- Paper, cardboard, newspaper and magazines
- Plastics
- Various construction debris

During FY 97, Berkeley County processed 729,800.91 tons, Charleston County processed 179,170.69 tons, and Dorchester County processed 10,549.29 tons of recycled materials.

#### **4.4.8 Oil and Hazardous Materials Spill Response**

##### **4.4.8.1 Cargo Spills at Port Facilities or on Open Water**

##### **Federal Regulations**

The Oil Pollution Act (OPA) of 1990 is a federal program created to provide prevention, response, liability, and compensation for the release of oil from vessels and facilities to the waters. OPA 90 requires that an Area Committee be established to plan for a coordinated community response to an oil discharge or a hazardous substance release. This committee is required to have cognizant Federal, state, and local government agency representation. In addition, OPA 90 requires each owner or operator of a tank vessel or facility to submit a Spill Prevention Control and Countermeasure Plan (SPCC).

The National Response System (NRS) was developed to coordinate all government agencies with the responsibility for environmental protection, in a focused response strategy for the immediate and effective cleanup of an oil spill or hazardous substance release. The National Response Team (NRT) coordinates the activities of the Regional Response Team (RRT), which in turn oversees and assists the Area Committees. The NRT consists of the following agencies:

- U.S. Coast Guard
- EPA
- Federal Emergency Management Agency
- Department of Defense
  - U.S. Army Corps of Engineers
  - U.S. Navy
- Department of Energy
- U.S. Department of Agriculture
  - Forest Service
  - Agriculture Research Service
  - Soil Conservation Service
  - Animal and Plant Health Inspection Service
  - Food Safety and Inspection Service
- Department of Commerce
  - National Oceanographic and Atmospheric Administration
  - National Marine Fisheries Service
  - National Weather Service
- Health and Human Services
  - U.S. Public Health Services
  - Agency for Toxic Substances and Disease Registry
  - Centers for Disease Control
  - Food and Drug Administration
- Health Resources and Service Administration
- National Institutes for Environmental Health Sciences
- Department of Justice
- Department of Labor
  - Occupational Safety and Health Act
- Department of Transportation
  - Research and Special Programs Administration
- Department of State
- Department of the Interior
  - U.S. Fish and Wildlife Service
  - U.S. Geological Survey
  - Bureau of Land Management
  - Minerals Management Service
  - Bureau of Mines
  - Office of Surface Mining
  - National Park Service
  - Bureau of Reclamation
  - Bureau of Indian Affairs
  - Office of Territorial Affairs
- Nuclear Regulatory Commission
- General Services Administration
- National Response Center

Federal response is coordinated through a single, predesignated agent, the Federal On-Scene Coordinator (FOSC). The FOSC reports to, and receives advice from, the regional and district offices of the primary advisory agencies.

The National Preparedness for Response Exercise Program (PREP) was developed to establish a workable exercise program that meets the intent of the mandates of OPA 90. Every three years, all components of the entire response plan must be exercised.

Coast Guard employees, other government employees, and contract personnel involved in oil spill response activities must comply with all applicable worker health and safety laws and regulations. Coast Guard employees and contractors that regularly respond to spills are required to have 40 hours of hazardous material response training as required by OSHA. A site safety and health officer will be assigned to develop a site safety and health plan when personnel must enter contaminated areas.

A Spill of National Significance (SONS) is that rare, catastrophic spill event that captures the nation's attention due to its actual damage or significant potential for adverse environmental impact. A SONS is a spill that greatly exceeds the response capability at the local and regional levels that, due to its size, location, and actual or potential for adverse impact on the environment is so complex, it requires extraordinary coordination of Federal, state, local, and private resources to contain and cleanup. Only the Commandant of the Coast Guard or the Administration of the EPA can declare a SONS. The response to a SONS event must be a coordinated response that fully integrates the FOSC's response organization with the SONS response organization.

When a SONS is declared, the National Incident Commander (NIC) will proceed to the scene, assume the role of the FOSC and take strategic control of the situation. The Alternate National Incident Commander (NICA) will be the Coast Guard District Commander in whose district the spill has occurred.

The Chief of the Coast Guard Headquarters Office of Marine Safety, Security, and Environmental Protection will direct the Headquarters Crisis Action Center (CAC) operations. The CAC Chief will be the key advisor to the Commandant of the Coast Guard and to the NIC during the incident.

### **State Regulations**

DHEC is designated a natural resource trustee in the state of South Carolina under the Federal Comprehensive Environmental Response, Compensation, and Liability Act. A State On-Scene Coordinator (SOSC) will be responsible for determining DHEC's level and method of response. DHEC maintains an Emergency Response Section (ERS) as the central point of reporting releases of oil and hazardous materials within the state.

When working under the Federal response plan, the State On-Scene Coordinator (SOSC) assists the FOSC in responding to, and mitigating spills and releases. The SOCS is normally vested with the authority to permit response activities and require certain precautions within the state's boundaries. The SOSC is critical to the success of any response action.

DHEC trains and maintains an emergency response team (ERT) to provide assistance and guidance during spill incidents. Additionally, they provide monitoring for spill movement and technical advise on control, containment, clean up, and disposal of spilled material.

### **Local Involvement**

South Carolina State's Emergency Powers Act empowers local fire departments to respond to oil spills and hazardous material releases regardless of whether a fire is involved. The Charleston County Hazardous Materials Division (CCHMD) imposes fees on businesses that is used to improve local response to hazardous materials incidents through training, equipment, and advice.

### **Existing Plans and Components**

The main existing program for the Port of Charleston is the Captain of the Port (COTP) Charleston, South Carolina Area Contingency Plan. The geographic area covered by this plan includes the commercial ports



of Charleston and Georgetown, and numerous harbors for fishing and recreational vessels. This Area Contingency Plan describes the strategy for a coordinated Federal, state, and local response to a discharge.

The Area Contingency Plan includes instructions on how the following operations will be performed:

- Environmental assessment
- Technical and scientific coordination
- Strategic planning
- Cleanup and protection of the environment
- Air operations
- Equipment staging
- Wildlife recovery and rehabilitation
- Communications
- Finances

The hazardous materials release response consists of the following:

- Discovery and notification
- Preliminary assessment and initiation of action
- Removal
- Site evaluation and National Priorities List determination
- Remedial action
- Cost recovery and documentation

The Area Committee reviews and updates Area Contingency Plans annually. Reviews include the following:

- Emergency notification list
- Response equipment type and amount
- Sensitive environmental areas
- Hazard/risk assessment of the area
- Response strategies
- Oil dispersant approval

The current list of response equipment from the Contingency Plan is included in [Appendix 4.4.8-1](#).

### **Oil Spill History at Ports or on Open Water**

In recent years, no SONS have involved bunkers or cargo from major vessels or facilities. However, small spills have occurred from these sources. Most of the small spills have been less than 50 gallons and were diesel fuels. Most of the oil spills were from fishing and pleasure vessels, and land-based sources.

Fishing vessels and pleasure craft account for 2 to 4 oil spills per month. Most of these spills are between 5 and 50 gallons of diesel fuel or oily bilge water. These small spills are not usually contained or cleaned.

Approximately 6 times a year, fishing vessels or pleasure craft are responsible for larger spills due to sinkings, groundings, or fires. These are normally diesel fuel with a spill range of 300 to 1,000 gallons. Effective cleanups are possible for most of these incidents; however, at times the location of the vessels or weather conditions limit cleanup actions.

Land-based spills include releases from construction sites and marinas. These sources account for about 2 spills each month. These are normally small spills of diesel fuel or hydraulic fluid.

[Table 4.4.8-1](#) summarizes the typical type of oil spills that have been released from vessels and ship terminals in the past 2 years at Charleston and Berkeley counties. This list is not a complete list of oil spills, but a summary of spills associated with the shipping business.

### **Hazardous Material Release History**

Cargo containers may contain hazardous materials. Spills from these containers occur once or twice a month. Normally, these spills do not impact the water. [Table 4.4.8-1](#), previously referenced, shows the type and quantity of these spills. Most of the spills are very small quantities.

The most notable hazardous materials releases in Charleston Harbor include the following:

- A 5-week response to a release of 615 pounds of magnesium phosphide in the number 1 hold of the M/V SANTA CLARA. Magnesium phosphate was deactivated, removed, and disposed. No magnesium phosphide was released into the Charleston Harbor.
- A 36-hour response to a monchloroacetic acid release aboard the M/V NEWARK BAY in August of 1993.
- A 3-month response to a cyanuric chloride release aboard the M/V EVER ROYAL in May 1996. Although the initial incident aboard the vessel was cleaned-up within one week, neutralizing material on-site required another 2.5 months.
- A 10-month response to dioxin release near Charleston Entrance Channel. The release occurred as a result of the intentional grounding of a hopper barge, F/B PATRICIA SHERIDAN, containing approximately 12,500 tons of New York Harbor dredge spoils tainted with dioxin. The intentional grounding was performed because the barge was taking on a heavy port list and the tug captain feared losing the barge in the navigation channel. After grounding, the barge took on a greater list and released approximately 2,500 tons of its tainted cargo near the entrance channel. The response required three dredging operations to thoroughly clean the area.

#### **4.4.8.2 Cargo Spills While in Transit by Truck**

### **Federal Regulations**

The Superfund Amendments and Reauthorization Act (SARA) Title III requires each local emergency planning committee (LEPC) to prepare comprehensive hazardous substances emergency response plans. These emergency plans are to be joint efforts of the local law enforcement, fire departments, emergency medical service, local industry, and community.

### **State Regulations**

South Carolina follows the requirements of SARA and does not impose any additional emergency response regulations. Various South Carolina agencies are required notification when a hazardous material release

by truck occurs. The hazardous substances emergency response plans include lists of applicable state agencies to contact.

### **Local Involvement**

Berkeley County Emergency Operations Plan, Annex P - Hazardous Materials, addresses hazardous material releases in Berkeley County. In Charleston County, releases are addressed by the Emergency Materials Incident Response. Both plans address the following items:

- Incident classification
- Personnel roles, lines of authority, and communication
- Safe distances and places of refuge
- Site security and control
- Decontamination procedures
- Emergency medical treatment and first aid
- Response procedure
- Personal protection equipment

Resources for the plans include, but are not limited to:

- Emergency medical services, fire departments, sheriff departments, and hazardous material response groups
- South Carolina Highway Patrol, and South Carolina Department of Transportation
- Various Federal agencies
- The plans list 24-hour phone numbers for all the resources.

### **Truck Spill History**

The South Carolina Department of Health and Environmental Control maintains records of hazardous materials spills from trucks. From January 1996 to October 1997, 19 spills from trucks were recorded in Charleston and Berkeley counties. Of these spills, 16 were from the truck's diesel fuel engine and not from the truck's cargo. [Table 4.4.8-1](#), previously referenced, contains details on these spills.

#### **4.4.8.3 Cargo Spills While in Transit by Rail**

### **Federal Regulations**

#### **U.S. Department of Transportation**

The U.S. Department of Transportation provides regulations for the transport of hazardous materials in 49 CFR 170-179.

#### **Federal Railroad Administration**

The Federal Railroad Administration (FRA), a part of the U.S. Department of Transportation, is the Federal agency regulating railroad safety. FRA promulgates the U.S. Department of Transportation Regulations and enforces these regulations at rail facilities and wherever rail operations occur. FRA regulates the movement of hazardous materials by rail. Rail cars containing hazardous materials must have proper documentation,

including identification of the material and an emergency response telephone number. Cars with hazardous materials must display placard and/or other markings identifying contents. Cars which are carrying incompatible commodities cannot be placed next to one another.

### **Surface Transportation Board**

The Surface Transportation Board Manual requires the railroads to identify the following information when hazardous materials are being transported:

- Materials and quantity
- Frequency of transporting the materials
- Identification of reactive materials
- Safety practices
- Applicant's safety record on derailments, accidents, and hazardous spills
- Contingency plans for releases
- Likelihood of a release

### **Environmental Protection Agency**

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) regulates the handling of hazardous waste.

The Superfund Amendments and Reauthorization Act (SARA) Title III requires each local emergency planning committee (LEPC) to prepare comprehensive hazardous substances emergency response plans. These emergency plans are to be joint efforts of the local law enforcement, fire departments, emergency medical service, local industry, and community.

If a spill of hazardous materials was to occur, the clean-up of the spill would be regulated by the Resource Conservation and Recovery Act of 1976 (RCRA).

### **State Regulations**

South Carolina follows the requirements of SARA and does not impose any additional emergency response regulations. Pertinent South Carolina agencies are notified of hazardous material releases.

### **Other Guidelines**

The Association of American Railroads (AAR) publishes guidelines concerning the transport of hazardous materials. The AAR requires its members to comply with these guidelines when operating within the United States.

The AAR, the Chemical Manufacturers Association (CMA), and the Railroad Progress Institute formed the Inter-Industrial Rail Safety Task Force (IIRSTF) in 1989. The group reviewed risk management and public communication requirements associated with the movement of hazardous materials. IIRSTF then issued the following recommendations:

- Designation of key trains - Any train with 5 or more carloads of materials classified as poison inhalation hazards, or a combination of 20 or more carloads containing explosives, flammable gasses, poison inhalation hazard commodities, or environmentally sensitive chemicals. Train crews identify key trains from their waybills or as determined by the conductor. Key trains have restrictions such as a 50 miles per hour maximum speed and constraints for meeting and passing trains.
- Designation of key routes - Any track with an annual volume of 10,000 car loads or intermodal tank loads of any hazardous materials. Key routes have track maintenance requirements and have a maximum allowable distance of 40 miles between track-side detectors.
- Rail yard operating practices - Safe train switching procedures that limit the number of cars containing certain commodities that can be cut-off.
- Storage distances - Minimum distances from the mainline tracks with passenger train operations to areas where hazardous materials are stored and handled. For example, it is recommended that unloading or loading of flammable gases occur no closer than 100 feet from the mainline, and the tracks be bonded and grounded to prevent static electrical spark ignition.
- Maintenance and inspection - Routine practices for maintaining and inspecting infrastructure and transportation equipment.
- Risk assessment - Methodology for conducting a quantitative risk assessment of individual risk reduction options, such as train placement and train speed.

### **Railroad Operator Response**

The railroads have developed their own hazardous materials response programs. The railroads maintain a staff of environmental and health/safety professionals to respond to the spills. The program consists of the following steps:

- The railroad crews are trained to immediately radio the dispatcher and contact the railroad hazardous materials team.
- The railroad hazardous materials team will contact the shipper and receiver to determine hazardousness of the material.
- Outside services such as Chemical Transportation Emergency Center (CHEMTREC) will be used to learn more about the materials hazards, if necessary.
- The railroad team will coordinate the activities of the fire departments and county hazardous materials teams.
- The railroad team will conduct all notifications to Federal, state, and local authorities.
- Local involvement will be used to isolate the release, evacuate the area, and fight fires, if necessary.

CSX Transportation Inc., a potential provider of rail services for the Proposed Project, has been involved in the Transportation Community Awareness and Emergency Response (TRANSCAER) Program since

1988. Under this program, CSX holds training sessions which include local emergency response units. CSX informs these units about its response programs and policies and seeks to form cooperative working agreements.

Additional emergency response resources include private, on-call contractors who provide supplemental hazardous materials spill response equipment and personnel. These contractors are located throughout the CSX system and can be at a spill incident within 2 to 3 hours.

### **Rail Spill History**

In the Charleston area for the past 2 years, 6 spills have been associated with rail transportation. Of these, 3 spills were diesel fuel from the train engine. Details of the spills are contained in [Table 4.4.8-1](#), previously referenced.

CSX has been selected to illustrate a rail emergency response to potential hazardous material spills. CSX has provided an overview of their spill history for the Charleston area from 1986 to February 1998:

<b><u>Spill Type</u></b>	<b><u>Comments</u></b>
Non accident releases (minor leaks) - 26 total	24 of the 26 occurred in the rail yard
Derail with a hazardous materials release - 2 total	Released less than 10 gallons, response was to cleanup soil contamination. No injuries to individuals. One of the two occurred within the rail yard.
Leak from rail engine diesel fuel tank - 2 total	No injuries to individuals, cleanup response consisted of soil removal.
Other leaking containers - 10 total	All were minor spills and occurred at the rail yard, intermodal ramp, or intermodal bulk transfer facility.

Most of the spills occurred on CSX's property. None of the spills over the past 10 years have endangered the public health. Necessary environmental cleanup has consisted of contaminated soil removal and backfilling, which has been performed by CSX.

## **4.4.9 Electrical, Gas, Telephone, and Cable Television**

### **4.4.9.1 Electrical**

Four electrical suppliers serve the study area: South Carolina Electric & Gas (SCE&G), Berkeley Electric Cooperative, Edisto Electric Cooperative, and Santee Cooper. The suppliers that provide most of the electrical power to the study area are SCE&G and Santee Cooper through Berkeley Electric Cooperative. A summary of each provider is presented in the following paragraphs.

### **South Carolina Electric & Gas**

SCE&G, a subsidiary of the SCANA Corporation, operates three electrical generation plants within the Tri-County region. One combustion turbine electric generating plant is located along the Ashley River. The second plant, a coal-fired generating plant, is located near Bushy Park. The third plant, a combination of three coal-fired generating plants, is located along the Edisto River.

SCE&G provides electrical power to the Mikasa plant in the Cainhoy region and residential and industrial service on Daniel Island. Daniel Island does not have a primary transmission line; however, the Island does have secondary transmission lines operating at 23 kV that provide power to the residential areas. SCE&G envisions the Westvaco steam electric co-generation plant as the primary source of the electrical power on Daniel Island to accommodate the rapid industrial and residential development occurring on the island. The Westvaco co-generating plant could supply the power to a primary transmission line on Daniel Island and provide back-up power to the Mount Pleasant area.

### **Berkeley Electric Cooperative**

Berkeley Electric Cooperative, Inc. (BEC) is a non-profit organization that provides service to approximately 60,000 member/owners in Charleston, Berkeley, and Dorchester counties. In addition, BEC has franchise agreements with several municipalities and their consumers are in incorporated areas.

### **Edisto Electric Cooperative**

Edisto Electric Cooperative is a non-profit organization that provides electrical power to outlying rural areas of Dorchester and Berkeley counties. Most of the Edisto Electric Cooperative service area is located outside of the study area.

### **Santee Cooper**

Santee Cooper is the fourth largest public-power system in the State of South Carolina. Santee Cooper began services in 1942 with a hydroelectric power plant located on Lake Moultrie. Santee Cooper serves 110,000 retail customers in Berkeley, Georgetown, and Horry counties and generates electric power to 380,000 customers. Santee Cooper operates one coal-fired and one hydroelectric generating plant within the study area, and both of these plants are located in Berkeley County. Santee Cooper has various electric co-operatives under their authority that provide service within the study area.

In 1978, the South Carolina state legislature defined the Santee Cooper service area as Moncks Corner, St. Stephen, Russellville, Macedonia, Jamestown, Goose Creek, Bonneau, City of North Charleston, Johns Island, Leagerville, Wadmalaw, and Seabrook Island. Santee Cooper also serves various industrial customers: AIMAX, JW Aluminum, and Mikasa facilities. Santee Cooper recently extended their transmission lines to provide electrical service to the Newcor and Amoco facilities.

#### **4.4.9.2 Natural Gas**

SCE&G currently serves sections of Charleston, Berkeley, and Dorchester counties with gas supplied by the South Carolina Pipeline Corporation. South Carolina Pipeline Corporation (SCPC) is SCE&G's natural gas supplier. The existing pipeline operates in the 150 - 250 psi range and begins at the outlet of the SCPC East Cooper Town Border Station, extends southward along SC-Highway 33, at I-526 the pipeline follows I-526 towards Mount Pleasant, and terminates at the Daniel Island Regulating Station. A recently installed natural gas pipeline will serve the developing areas along SC-Highway 33 and Daniel Island.

#### **4.4.9.3 Telephone and Cable Television**

Bell South is the main telephone provider in the Tri-County area and serves approximately 30,000 people in Lower Berkeley County, including Daniel Island.

Daniel Island Cable Company is the cable service provider for Daniel Island with the use of Bell South lines. Bell South Entertainment currently has 48 customers and is experimenting with the type of service to be provided. The Daniel Island Cable Company/Bell South signed a 20-year contract to serve the area.

Other cable television companies in the Tri-County area include Comcast and Time Warner Cable. These two cable television companies combined provide services to portions of Charleston County and Berkeley County.